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L4: Entry 2 of 2

File: USPT

Dec 31, 2002

US-PAT-NO: 6500426

DOCUMENT-IDENTIFIER: US 6500426 B1

TITLE: Carbohydrate-based enzyme-containing granules for use in animal feed

DATE-ISSUED: December 31, 2002

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
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APPL-NO: 09/ 090528 [PALM]

DATE FILED: June 4, 1998

## PARENT-CASE:

CROSS REFERENCE TO RELATED APPLICATIONS This application claims the priority of U.S. Provisional Patent Application 60/048,611 filed Jun. 4, 1997, now abandoned, and European Patent Application No. 97201641.4 filed in the Netherlands on Jun. 4, 1997. These applications hereby are incorporated in their entireties by reference.

## FOREIGN-APPL-PRIORITY-DATA:

COUNTRY	APPL-NO	APPL-DATE
EP	97201641	June 4, 1997

INT-CL: [07] A61 K 38/43, A61 K 38/46, C12 N 11/10, C12 N 9/98, C12 N 9/96

US-CL-ISSUED: 424/94.1; 424/94.3, 424/94.6, 424/94.61, 426/2, 426/805, 426/807, 435/177, 435/178, 435/179, 435/187, 435/188

US-CL-CURRENT: 424/94.1; 424/94.3, 424/94.6, 424/94.61, 426/2, 426/805, 426/807, 435/177, 435/178, 435/179, 435/187, 435/188

FIELD-OF-SEARCH: 435/174, 435/177, 435/178, 435/179, 435/180, 435/182, 424/94.1, 424/94.3, 424/94.6, 424/94.61, 426/2, 426/805, 426/807

## PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

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## CLAIMS:

What is claimed is:

1. A process for the preparation of an enzyme-containing granulate suitable for use in an animal feed, the process comprising: (a) making a mixture of (1) an enzyme, (2) a solid carrier comprising at least about 15% (w/w) of an edible carbohydrate polymer that has less than 5% (w/w) protein, and (3) water (b) mechanically processing the mixture from (a) by low pressure extrusion such that extrusion does not allow temperature of the mixture to rise above 40.degree. C. to obtain enzyme-containing granules; and (c) drying the enzyme-containing granules obtained in (b).
2. A process according to claim 1 wherein the water and enzyme are provided as an enzyme-containing aqueous liquid.
3. A process according to claim 2 wherein the liquid is a filtrate derived from a fermentation process resulting in production of the enzyme.
4. A process according to claim 1 wherein the enzyme-containing granules from (b) are subject to spheronising and/ or the drying of (c) is in a fluid bed agglomerator.
5. A process according to claim 1 wherein the mixture of (a) is kneaded before extrusion.
6. A process according to claim 1 wherein the granules obtained are spheronised prior to drying.
7. Enzyme-containing granules produced by a process according to claim 1.
8. Enzyme-containing granules according to claim 7 wherein the granules comprise one at least one divalent cation.
9. Enzyme-containing granules according to claim 7 wherein the granules comprise

one or more hydrophobic, gel-forming or water insoluble compound(s).

10. Enzyme-containing granules according to claim 9 wherein the hydrophobic, gel-forming or water insoluble compound comprises a component selected from the group consisting of cellulose, polyvinyl alcohol (PVA), and an edible oil.

11. Enzyme-containing granules according to claim 10 wherein: (a) the cellulose is derivatised and is selected from the group consisting of hydroxy-propyl-methyl-cellulose, carboxy-methyl-cellulose and hydroxy-ethyl-cellulose; or (b) the edible oil is soy oil or canola oil; or (c) the derivatised cellulose and hydroxy-ethyl-cellulose, and the edible oil is soy oil or canola oil.

12. Enzyme-containing granules according to claim 7 wherein the enzyme is selected from the group consisting of a phytase, endo-xylanase, and a .beta.-glucanase.

13. A composition comprising enzyme-containing granules according to claim 7.

14. A composition according to claim 13 which is an edible feed composition.

15. A composition to claim 13 which is an animal feed.

16. A composition which comprises pellets of one or more feed substance(s) or ingredient(s) for making a feed substance enzyme-containing granules according to claim 7.

17. A composition according to claim 16 wherein the ratio of enzyme-containing granules feed substance(s) or ingredients for making a feed substance is at least about 1 g: 1 kilogram.

18. A process for promoting the growth of an animal, the process comprising feeding an animal with a diet that comprises a composition according to claim 13.

19. A process for the preparation of an animal feed or a premix for making an animal feed, the process comprising mixing enzyme-containing granules according to claim 7 with one more animal feed substance(s) or ingredient(s) for making an animal substance.

20. A process according to claim 19 wherein the mixture of feed substance(s) and enzyme-containing granules is sterilised or treated with steam, and is pelletised.

21. A process according to claim 20 wherein after pelletisation the mixture is dried.

22. A composition which is an animal feed or a premix for making an animal feed prepared by a process according to claim 19.

23. A process for promoting the growth of an animal, wherein said process comprises feeding said animal with enzyme-containing granules according to claim 7 or a composition according to claim 22.